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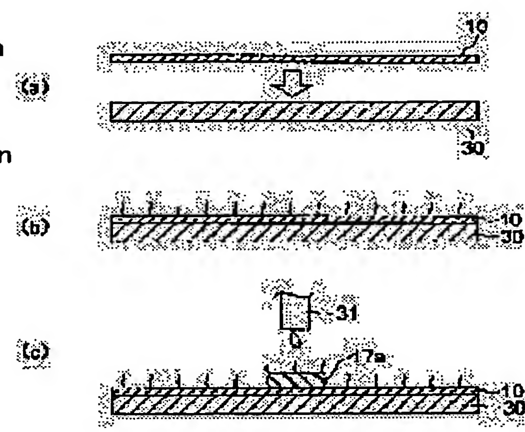
(54) MANUFACTURE OF SEMICONDUCTOR DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To coat a resin layer on a wafer with a uniform coating thickness by spin coating method.

SOLUTION: This method is for coating a resin layer on a wafer 10 by spin coating. The wafer 10 is heated, and a liquid resin 17a is dripped on the wafer. Subsequently, the wafer 10 is rotated so that the liquid resin 17a is spread to the outer peripheral side of the wafer by centrifugal force. Thus, a resin layer with a uniform coating thickness is provided on the wafer 10.



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CLAIMS

[Claim(s)]

[Claim 1] The manufacture approach of a semiconductor device of having the process which is the approach of forming a resin layer with a spin coat method on a wafer, and warms a wafer, the process which trickles liquefied resin on said wafer, and the process which applies said liquefied resin to the periphery section side of said wafer according to a centrifugal force, extends by rotating said wafer, and is used as the resin layer of uniform thickness on said wafer.

[Claim 2] the process which warms said wafer -- setting -- warming -- the manufacture approach of the semiconductor device according to claim 1 performed by ****(ing) said wafer on the pedestal which has a means.

[Claim 3] the process which rotates said wafer -- setting -- said warming -- the manufacture approach of the semiconductor device according to claim 2 performed by ****(ing) said wafer on the pedestal which has a rolling mechanism different from the pedestal which has a means.

[Claim 4] from the process which warms said wafer up to the process which trickles liquefied resin on said wafer -- said warming -- the manufacture approach of the semiconductor device according to claim 3 which **** said wafer on the pedestal which has a means, performs, and is performed by ****(ing) said wafer on the pedestal which has said rolling mechanism for the process which rotates said wafer.

[Claim 5] the process which warms said wafer -- said warming -- the manufacture approach of the semiconductor device according to claim 3 which **** said wafer on the pedestal which has a means, performs, and is performed by ****(ing) said wafer on the pedestal which has said rolling mechanism for from the process which trickles liquefied resin on said wafer to the process which rotates said wafer.

[Claim 6] from the process which the pedestal which **** and warms said wafer in the process which warms said wafer is a pedestal which has a rolling mechanism further, and warms said wafer up to the process which rotates said wafer -- said warming -- the manufacture approach of the semiconductor device according to claim 2 performed by ****(ing) said wafer on the pedestal which has a means and has a rolling mechanism further.

[Claim 7] The liquefied resin which said wafer warmed according to the process which warms said wafer in the process which rotates said wafer cooled gradually, and was simultaneously dropped on said wafer is the manufacture approach of the semiconductor device according to claim 1 gradually cooled with breadth to the periphery section side of said wafer according to a centrifugal force.

[Claim 8] The manufacture approach of a semiconductor device according to claim 1 of adjusting the difference of the viscosity of said liquefied resin by the peripheral-velocity difference of the core of said wafer, and the periphery section according to the difference of the temperature of said liquefied resin in the process which rotates said wafer.

[Claim 9] The manufacture approach of the semiconductor device according to claim 1 which trickles liquefied resin into the bump forming face of said wafer in the process which has further the process which forms a semiconductor circuit pattern on said wafer, and the process which forms the bump linked to said semiconductor circuit pattern on said semiconductor circuit pattern formation side of said wafer, and trickles liquefied resin on said wafer in front of the process which warms said wafer.

[Claim 10] The manufacture approach of a semiconductor device according to claim 9 of having further the cure process of said liquefied resin, the process which divides said wafer for every predetermined semiconductor circuit pattern, and the process which mounts the division object of said wafer which has said divided predetermined semiconductor circuit pattern on a mounting substrate after the process which rotates said wafer.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] Especially this invention relates to the manufacture approach of a semiconductor device of having a miniaturization and the package gestalt by which densification was carried out, about the manufacture approach of a semiconductor device.
[0002]
[Description of the Prior Art] Research and development have been made as a technical problem with how important to raise the component-mounting consistency on a mounting substrate, while the demand to the miniaturization of portable electronic devices, such as a digital camcorder, a digital cellular phone, or a notebook computer, thin-shape-izing, and lightweight-izing has realized cutback-ization of 70 percent in semiconductor devices, such as VLSI in recent years, in three years, in order to respond [which is becoming strong steadily] to this.
[0003] As a package gestalt of a semiconductor device, conventionally The lead inserting type (THD:Through Hall Mount Device) which inserts and mounts lead wire in the through hole established in printed circuit boards, such as DIP (Dual Inline Package) or PGA (Pin Grid Array), Lead wire, such as QFP (Quad Flat (L-Leaded) Package) or TCP (Tape Carrier Package), is soldered on the surface of a substrate. The surface mount mold (SMD:Surface Mount Device) to mount has been used. In order to advance the further miniaturization, package size is brought close to the magnitude of a semiconductor chip infinite, the approach (flip chip mounting) of turning and mounting the pad effective area side of a semiconductor chip in a mounting substrate according to the package gestalt called the chip-size package (referred to also as CSP:Chip Size Package and FBGA (Fine-Pitch BGA)) which realizes further miniaturization and densification is collecting attention, research is actively made by current, and many proposals are shown.
[0004] Although the buffer base material called INTAPOZA is usually arranged and used between the semiconductor chip and the mounting substrate as the mounting approach of the semiconductor chip of the above-mentioned CSP gestalt, the packaging approach in wafer level is briskly considered for current, the further miniaturization of a semiconductor device, low-cost-izing, and improvement in the processing speed of an electronic circuitry. In the above-mentioned package-ized approach, the resin layer for surface protections is formed on the semiconductor circuit pattern formation side of the wafer

ended to the formation process of a semiconductor circuit pattern, a dicing process divides for each semiconductor chip of every, and it mounts on a mounting substrate as it is. In the above-mentioned approach, it becomes unnecessary like the assembler of the conventional semiconductor device, and it can bring big effectiveness to half-******** cost reduction and delivery date compaction.
[0005] In the packaging approach in the above-mentioned wafer level, although forming the resin layer for surface protections on the semiconductor circuit pattern formation side of a wafer is proposed, as the approach, the spin coat method is known, for example.
[0006]
[Problem(s) to be Solved by the Invention] However, when forming the resin layer for surface protections on the semiconductor circuit pattern formation side of a wafer with the above-mentioned conventional spin coat method, the problem that it is difficult to coat a resin layer with uniform thickness on the surface of a wafer arises. The production process of the manufacture approach of a semiconductor device of generating the above-mentioned problem is explained with reference to a drawing.
[0007] First, as shown in the perspective view of drawing 10 (a), liquefied resin 17a used as a surface protective layer is dropped by a dispenser etc. on the wafer 10 center section of the semiconductor circuit pattern formation side of a wafer.
[0008] Next, as shown in the perspective view of drawing 10 (b), by rotating a wafer, liquefied resin 17a is applied to the periphery section side of a wafer 10 according to a centrifugal force, and it extends. At this time, thick-film section 17b of the resin which upheaves to the core of a wafer 10 is formed.
[0009] Next, as shown in drawing 11 ((a) is a perspective view and (b) is a sectional view in A-A' in (a)), a wafer is rotated further, and liquefied resin 17a is applied and extended to a wafer 10 on the whole surface. A part for the surplus of the liquefied resin which spread round the whole surface is discharged from the periphery section of a wafer 10. At this event, thick-film section 17b of resin will remain in the core of a wafer 10.
[0010] The above-mentioned phenomenon is explained as follows. In non-Newtonian fluid system thixotropic fluid, such as liquid resin, shearing stress decreases, so that the time amount which gave shearing stress depending on the time amount on which apparent viscosity made not only a shear rate but shearing stress act, so that the shear rate was large is long. That is, apparent viscosity decreases. Therefore, although the resin dropped at the wafer core moves to the periphery section according to a centrifugal force when applying and opening liquefied resin with a spin coat method, the direction of the resin of the periphery section has a large shear rate, and the time amount which was able to give shearing stress also has it. [longer than the resin of a core] That is, the viscosity in the periphery section becomes small rather than the viscosity in a wafer core. It is difficult for resin thickness to become thick and for the core to coat homogeneity under the effect of the above-mentioned property rather than the wafer periphery section, on the whole wafer surface.
[0011] This invention is made in view of the above-mentioned problem, and this invention aims at offering the manufacture approach of the semiconductor device which can coat a resin layer with uniform thickness on a wafer with a spin coat method.
[0012]
[Means for Solving the Problem] In order to attain the above-mentioned object, by the process which the manufacture approach of the semiconductor device of this invention is the approach of forming a resin layer with a spin coat method on a wafer, and warms a wafer, the process which trickles liquefied resin on said wafer, and rotating said wafer, said liquefied resin is applied to the periphery section side of said wafer according to a centrifugal force, and it extends, and it has the process used as the resin layer of uniform thickness on said wafer.
[0013] the process at which the manufacture approach of the semiconductor device of above-mentioned this invention warms a wafer suitably — setting — warming — it carries out by ****(ing) said wafer on the pedestal which has a means. A wafer is ****(ed) and performed on the pedestal which

has a means. up to the process which trickles liquefied resin on a wafer still more suitably from the process which warms a wafer -- warming -- Carry out by ****(ing) a wafer on the pedestal which has a rolling mechanism for the process which rotates a wafer. A wafer is ****(ed) and performed on the pedestal which has a means. or the process which warms a wafer -- warming -- In the process which rotates said wafer, such as carrying out by ****(ing) a wafer on the pedestal which has a rolling mechanism even for the process which rotates a wafer from the process which trickles liquefied resin on a wafer said warming -- it carries out by ****(ing) said wafer on the pedestal which has a rolling mechanism different from the pedestal which has a means. or -- from the process which the pedestal which **** and warms said wafer still more suitably in the process which warms said wafer is a pedestal which has a rolling mechanism further, and warms said wafer up to the process which rotates said wafer -- said warming -- it carries out by ****(ing) said wafer on the pedestal which has a means and has a rolling mechanism further.

[0014] Said wafer warmed according to the process which warms said wafer in the process which rotates said wafer cools suitably the manufacture approach of the semiconductor device of above-mentioned this invention gradually, and the liquefied resin simultaneously dropped on said wafer is gradually cooled with breadth to the periphery section side of said wafer according to a centrifugal force.

[0015] The manufacture approach of the semiconductor device of above-mentioned this invention adjusts the difference of the viscosity of said liquefied resin by the peripheral-velocity difference of the core of said wafer, and the periphery section according to the difference of the temperature of said liquefied resin suitably in the process which rotates said wafer.

[0016] Suitably, in front of the process which warms said wafer, the manufacture approach of the semiconductor device of above-mentioned this invention has further the process which forms a semiconductor circuit pattern on said wafer, and the process which forms the bump linked to said semiconductor circuit pattern on said semiconductor circuit pattern formation side of said wafer, and trickles liquefied resin into the bump forming face of said wafer in the process which trickles liquefied resin on said wafer. It has further the cure process of said liquefied resin, the process which divides said wafer for every predetermined semiconductor circuit pattern, and the process which mounts the division object of said wafer which has said divided predetermined semiconductor circuit pattern on a mounting substrate still more suitably after the process which rotates said wafer.

[0017] The manufacture approach of the semiconductor device of above-mentioned this invention warms a wafer, and trickles liquefied resin on a wafer. Next, by rotating a wafer, liquefied resin is applied to the periphery section side of a wafer according to a centrifugal force, and it extends, and considers as the resin layer of uniform thickness on a wafer.

[0018] In the process which rotates the wafer after dropping of the liquefied resin to a wafer top according to the manufacture approach of the semiconductor device of above-mentioned this invention Although the wafer warmed beforehand cools gradually and the liquefied resin simultaneously dropped on the wafer is gradually cooled with breadth to the periphery section side of a wafer according to the centrifugal force The difference of the viscosity of the liquefied resin by the peripheral-velocity difference of the core of the wafer at this time and the periphery section can be adjusted according to the difference of the temperature of liquefied resin, and can make viscosity of liquefied resin comparable in the core and the periphery section of a wafer. Therefore, even if it is resin of hyperviscosity with CHIKUSO nature, a resin layer can be coated with uniform thickness on a wafer with a spin coat method.

[0019]

[Embodiment of the Invention] Below, the gestalt of implementation of the manufacture approach of the semiconductor device of this invention is explained with reference to a drawing.

[0020] Drawing 1 is the sectional view of a semiconductor device which manufactured by the manufacture approach of the semiconductor device concerning this operation gestalt. Pad electrode 11 forming face which consists of aluminum of semiconductor chip 10' etc. is covered with the surface protective coat 13 which consists of a silicon nitride layer or a polyimide layer, and pad electrode 11

part is carrying out opening. The electric conduction film 14 which consists of a cascade screen of chromium, copper, and gold etc. in this opening connects with the pad electrode 11, and is formed. This electric conduction film may be called the BLM (Ball Limitting Metal) film. Furthermore, the upside surface protective coat 15 which consists of polyimide is formed on the electric conduction film (BLM film) 14, and the bump formation field is carrying out opening. In the above-mentioned bump formation field, bump 16b which connects with the electric conduction film (BLM film) 14, for example, consists of a high-melting solder ball is formed. Here, in order to avoid contact by the adjoining bump, to the formation location of the pad electrode 11, the formation location of bump 16b is shifted and formed if needed, and pattern formation of the electric conduction film (BLM film) 14 is carried out so that it may respond to this. The semiconductor chip 10' front faces (actually upside surface protective coat 15 etc.) in the gap section of bump 16b are closed with the resin coat 17 which consists of an epoxy resin etc.

[0021] which the semiconductor chip 1 of a CSP gestalt consists of as mentioned above On the other hand, the mounting substrate 2 is connected to the land (electrode) 21 which consists of copper formed in the location corresponding to the formation location of bump 16b of the semiconductor chip 1 to mount on the top face of the substrate 20 which consists of a glass epoxy system ingredient, and a land 21, and it has the printed-circuit section which is formed on the front face of a substrate 20, a rear face, or both sides and which is not illustrated. Substrate 20 front face except land 21 part is covered with the solder resist 23.

[0022] It mounts so that bump 16b of the semiconductor chip 1 of the above-mentioned CSP gestalt and the land 21 of the mounting substrate 2 may correspond, and bump 16b and a land 21 are connected mechanically and electrically by the eutectic solder layer 19.

[0023] The manufacture approach of the above-mentioned semiconductor device is explained with reference to a drawing. First, as shown in drawing 2 (a), pattern formation of the pad electrode 11 which consists of an aluminum-copper alloy on the semiconductor wafer 10 with which the circuit pattern of a semiconductor chip was formed of the sputtering method, etching, etc. is carried out, the surface protective coat 13 which consists of a silicon nitride layer or a polyimide layer is covered and formed in the whole surface at the upper layer, and opening of the pad electrode 11 part of the surface protective coat 13 is carried out.

[0024] Next, as shown in drawing 2 (b), the cascade screen of chromium, copper, and gold is made to deposit, pattern processing is carried out and the electric conduction film (BLM film) 14 is formed in the pattern which connects with the pad electrode 11 bump 16b formed at an after process.

[0025] Next, as shown in drawing 2 (c), the upside surface protective coat 15 which consists of a polyimide layer etc. is covered and formed in the whole surface at the upper layer of the electric conduction film (BLM film) 14, and opening of the bump formation field of the upside surface protective coat 15 is carried out.

[0026] Next, as shown in drawing 3 (a), pattern formation of the resist film R which has pattern opening to the above-mentioned bump formation field is carried out according to a photolithography process. Next, the solder layer 16 is formed in pattern opening of the resist film R by forming a solder layer on the whole surface, for example with vacuum evaporation technique. Solder layer 16a is formed also in the upper layer of the resist film R at this time.

[0027] Next, as shown in drawing 3 (b), solder layer 16a formed in the upper layer of the resist film R is simultaneously removed by removing the resist film R by the lift off. Thereby, it can leave only the solder layer 16 formed in pattern opening of the resist film R.

[0028] Next, as shown in drawing 3 (c), it heat-treats, melting of the solder layer 16 is carried out, and bump 16b which consists of a high-melting solder ball by making it cool and solidify in the condition of having become a globular form with surface tension is formed.

[0029] Next, as shown in drawing 4 (a), a semiconductor wafer 10 is conveyed on a heater (work piece warming section) 30 according to the conveyance device in which it does not illustrate, and the semiconductor circuit pattern formation side formed in the semiconductor wafer 10 is turned upward,

and is ****(ed). A bump's etc. fine structure is omitted and drawn on the drawing.
[0030] next, as shown in drawing 4 (b), the skin temperature of a semiconductor wafer 10 becomes about 60 degrees C by heat conduction by warming the pedestal (work piece warming section) 30 with a built-in heater -- as -- a semiconductor wafer 10 -- warming -- it processes.
[0031] Next, as shown in drawing 4 (c), liquefied resin 17a used as a surface protective layer is dropped by a dispenser 31 etc. on the semiconductor wafer 10 center section currently warmed according to the pedestal (work piece warming section) 30 with a built-in heater after the event of a semiconductor wafer 10 reaching predetermined temperature. At this time, liquefied resin 17a is also warmed with a semiconductor wafer 30.
[0032] Next, as shown in drawing 5 (sectional view [in / (a) and / in (b) / A-A' in (a)]), a semiconductor wafer 10 is conveyed on the revolution pedestal (spin section) 32 from a heater (work piece warming section) according to the conveyance device in which it does not illustrate, and adsorption immobilization is carried out according to the adsorption device prepared in the revolution pedestal (spin section) 32. [a perspective view]
[0033] Next, as shown in drawing 6 (sectional view [in / (a) and / in (b) / A-A' in (a)]), by rotating a wafer 10 at a predetermined spin rotational frequency, liquefied resin 17a is applied to the periphery section side of a wafer 10 according to a centrifugal force, and it extends. [a perspective view] Here, it is made to follow on rotating a wafer 10, the wafer 10 warmed beforehand cools gradually, and liquefied resin 17a simultaneously dropped on the wafer 10 is gradually cooled with breadth to the periphery section side of a wafer 10 according to the centrifugal force.
[0034] Next, as shown in drawing 7 (sectional view [in / (a) and / in (b) / A-A' in (a)]), a wafer is rotated further, and liquefied resin 17a is applied and extended to a wafer 10 on the whole surface. [a perspective view] A part for the surplus of the liquefied resin which spread round the whole surface is discharged from the periphery section of a wafer 10.
[0035] Next, as are shown in drawing 8 (a), and a semiconductor wafer 10 is conveyed in oven from the revolution pedestal (spin section) 32 according to the conveyance device in which it does not illustrate, liquefied resin 17a is solidified by predetermined heat treatment (cure) and it is shown in drawing 8 (b) which is the sectional view expanded so that a bump's etc. fine structure could be distinguished to drawing 8 (a), the gap section of bump 16b is closed and the resin coat 17 is formed.
[0036] Next, as shown in drawing 9 (a), it is made to connect with bump 16b, and the eutectic solder layer 18 is formed with print processes, plating, or a replica method. By forming the eutectic solder layer 18, a bump's height can be made high, heat stress resistance can be raised, or the wettability of the solder when mounting in a mounting substrate can be raised, and connection dependability can be raised further. Next, according to a dicing process, along the cutting location D of a semiconductor wafer 10, a semiconductor wafer 10 is cut and it divides into the semiconductor chip 1 of each CSP gestalt.
[0037] Next, as shown in drawing 9 (b), the semiconductor chip 1 of a CSP gestalt is mounted in the mounting substrate 2 from a bump 16b forming face. The mounting substrate 2 is connected to the land (electrode) 21 which consists of copper formed in the location corresponding to the formation location of bump 16b of the semiconductor chip 1 to mount on the top face of the substrate 20 which consists of a glass epoxy system ingredient, and a land 21, and it has the printed-circuit section which is formed on the front face of a substrate 20, a rear face, or both sides and which is not illustrated. On the land 21, the precoat solder layer 22 which consists of eutectic solder is formed. Moreover, substrate 20 front face except land 21 part is covered with the solder resist 23. Alignment of bump 16b and the land 21 is carried out to the above-mentioned mounting substrate 2, and the semiconductor chip 1 of the above-mentioned CSP gestalt is mounted on it. By for example, 200-250-degree C heat treatment Bump 16b does not fuse, but carries out a reflow of the eutectic solder layer 18 or the precoat solder layer 22, forms the eutectic solder layer 19 in the junction location of bump 16b and a land 21, connects mechanically and electrically the semiconductor chip 1 and the mounting substrate 2 of a CSP gestalt, and results in the semiconductor device shown in drawing 1 .

[0038] In the above-mentioned operation gestalt, although dropping of liquefied resin 17a is made into conveyance before to the revolution pedestal (spin section) 32, you may carry out, after conveying to the revolution pedestal (spin section) 32. Moreover, in the above-mentioned operation gestalt, by using the pedestal (work piece warming section) 30 with a built-in heater, and the revolution pedestal (spin section) 32 as another pedestal, easy structure can constitute each pedestal, and a manufacturing cost can be controlled and manufactured. moreover, warming -- the pedestal which combines a function and a rolling mechanism -- using -- warming of the semiconductor wafer 10 of the above-mentioned production process -- it is also possible to perform even the process which applies liquefied resin 17a to the periphery section side of a wafer 10 according to a centrifugal force, and is extended by rotating a wafer 10 from a process on the same pedestal.
[0039] In the process which rotates the wafer after dropping of the liquefied resin to a wafer top according to the manufacture approach of the above-mentioned semiconductor device semiconductor device Although the wafer warmed beforehand cools gradually and the liquefied resin simultaneously dropped on the wafer is gradually cooled with breadth to the periphery section side of a wafer according to the centrifugal force The difference of the viscosity of the liquefied resin by the peripheral-velocity difference of the core of the wafer at this time and the periphery section can be adjusted according to the difference of the temperature of liquefied resin, and can make viscosity of liquefied resin comparable in the core and the periphery section of a wafer. Therefore, even if it is resin of hyperviscosity with CHIKUSO nature, a resin layer can be coated with uniform thickness on a wafer with a spin coat method, without a wafer center section becoming a thick film. moreover, the thickness of the above-mentioned resin coat 17 -- except for the viscosity of liquefied resin 17a -- the spin rotational frequency of a revolution pedestal (spin section), and resin -- warming -- controlling by temperature to some extent is possible.
[0040] On the center section of the mirror wafer which it ****(ed) to the pedestal (work piece warming section) with a built-in example (creation of Sample A) heater, and was warmed at 60 degrees C, the liquefied epoxy resin (the Nagase tiba company make, T693/R1004) was dropped. Next, the mirror wafer was conveyed on the revolution pedestal (spin section) from the pedestal (work piece warming section) with a built-in heater, and adsorption immobilization was carried out, and by making it rotate at a predetermined spin rotational frequency, the liquefied epoxy resin was applied to the periphery section side of a wafer according to the centrifugal force, it extended, and Sample A was created.
[0041] (Creation of Sample B) Without warming the above-mentioned mirror wafer at 60 degrees C, if it removed that the liquefied epoxy resin was dropped with ordinary temperature, the sample B as well as Sample A was created.
[0042] The thickness of 54.2 micrometers and the periphery section of the thickness of the wafer center section of the resin coat formed on the front face of the above-mentioned sample A was 52.0 micrometers, and the difference was 2.2 micrometers. On the other hand, the thickness of 85.7 micrometers and the periphery section of the thickness of the wafer center section of the resin coat formed on the front face of Sample B was 52.1 micrometers, and the difference was 33.6 micrometers. As mentioned above, it was checked that the thickness homogeneity of the resin layer formed on a wafer by warming a wafer beforehand before the process which rotates the wafer after dropping of the liquefied resin to a wafer top can be raised.
[0043] If it is semiconductor devices, such as an MOS transistor system semiconductor device, bipolar ************, a BiCMOS system semiconductor device, and a semiconductor device that carried logic and memory, as a semiconductor device manufactured by this invention, it is applicable even to what.
[0044] The manufacture approach of the semiconductor device of this invention is not limited to the gestalt of the above-mentioned operation. For example, although the resin coat is formed as a surface protective coat of a wafer in an operation gestalt, forming as a resin layer of the other objects is also possible. Moreover, the configuration of a pedestal with a built-in heater or a revolution pedestal, the conditions of each process, the structure of a wafer, etc. are not restricted to the content explained

with the gestalt of the above-mentioned operation. In addition, modification various in the range which does not deviate from the summary of this invention is possible.

[0045]

[Effect of the Invention] As mentioned above, according to the manufacture approach of the semiconductor device of this invention, a resin layer can be coated with uniform thickness on a wafer with a spin coat method.

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] Drawing 1 is the sectional view of the semiconductor device concerning an operation gestalt.

[Drawing 2] Drawing 2 is the sectional view showing the production process of the manufacture approach of the semiconductor device concerning an operation gestalt, in (a), to the opening process of a pad electrode, (b) shows even the formation process of the electric conduction film (BLM film), and (c) shows even the formation process of a surface protective coat.

[Drawing 3] Drawing 3 is the sectional view showing the process of a continuation of drawing 2 , and (c) shows even a solder ball bump's formation process by the reflow to the clearance process of the solder layer on the resist film according [(b)] to a lift off to the deposition process of a solder layer in (a).

[Drawing 4] the sectional view in which drawing 4 shows the process of a continuation of drawing 3 — it is — (a) — up to the conveyance process to the pedestal top with a built-in heater of a wafer — (b) — warming of a wafer — (c) shows even the dropping process of liquefied resin to a process.

[Drawing 5] It is a sectional view [in / (a) drawing 5 indicates even the conveyance process to the revolution pedestal top of a continuation of drawing 4 to be, and / in (b) / A-A' in (a)]. [a perspective view]

[Drawing 6] It is a sectional view [in / drawing 6 rotates the wafer of a continuation of drawing 5 , (a) which shows even the process which applies and opens liquefied resin, and / in (b) / A-A' in (a)]. [a perspective view]

[Drawing 7] It is a sectional view [in / (a) which shows even the process which drawing 7 applies liquefied resin to the periphery section of the wafer of a continuation of drawing 6 , and is extended, and / in (b) / A-A' in (a)]. [a perspective view]

[Drawing 8] Drawing 8 is the sectional view showing the process of a continuation of drawing 7 , (a) shows even the conveyance process from the revolution pedestal of a wafer to oven, and (b) shows even a cure process.

[Drawing 9] Drawing 9 is the sectional view showing the process of a continuation of drawing 8 , (a) shows even the supply process of an eutectic solder layer, and (b) shows even the mounting process to a mounting substrate.

[Drawing 10] Drawing 10 is the perspective view showing the formation process of the resin coat

concerning the conventional example, to the dropping process of liquefied resin, (b) rotates a wafer and (a) shows even the process which applies and opens liquefied resin.

[Drawing 11] It is a sectional view [in / (a) which shows even the process which drawing 11 applies liquefied resin to the periphery section of the wafer of a continuation of drawing 10 , and is extended, and / in (b) / A-A' in (a)]. [a perspective view]

[Description of Notations]

1 — The semiconductor chip of a CSP gestalt, 2 — A mounting substrate, 10 — Semiconductor wafer, 10' [— Electric conduction film (BLM film),] — A semiconductor chip, 11 — A pad electrode, 13 — A surface protective coat, 14 15 — 16 An upside surface protective coat, 16a — A solder layer, 16b — Bump, 17 [— An eutectic solder layer, 20 / — A substrate, 21 / — A land, 22 / — A precoat solder layer, 23 / — A solder resist, 30 / — A pedestal with a built-in heater, 31 / — A dispenser, 32 / — Revolution pedestal.] — A resin coat, 17a — Liquefied resin, 17b — 18 The thick-film section of resin, 19

[Translation done.]